

W. A. YOUNG & SON'S FOUNDRY AND MACHINE SHOP
Rices Landing
Greene County
Pennsylvania

HAER NO. PA-199

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Historic American Engineering Record
National Park Service
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HISTORIC AMERICAN ENGINEERING RECORD

W. A. YOUNG AND SONS FOUNDRY AND MACHINE SHOP

HAER No. PA-199

LOCATION: On Water Street along the Monongahela River, Rices Landing, Greene County, Pennsylvania.

DATES OF CONSTRUCTION: 1900-1908, closed 1965

PRESENT OWNER: Greene County Historical Society

PRESENT USE: Museum

SIGNIFICANCE: W. A. Young and Sons Foundry and Machine Shop is a well-preserved example of a local machine shop that served the industrial and personal needs of its surrounding area. It represents a transition between the village blacksmith's shop and mass produced and marketed machine parts. The shop's changing role in the community is significant within the context of the evolution of industrialization in the Monongahela Valley.

HISTORIANS: Frances C. Robb, Mark M. Brown, and Christopher H. Marston (1992)

PROJECT INFORMATION: The documentation of the W.A. Young and Sons Machine Shop was undertaken by the Historic American Engineering Record, in conjunction with the Steel Industry Heritage Task Force, Homestead, PA, and the Greene County Historical Society. Special help was received by Carol Fisher and the staff of the Greene County Historical Society; Olan West, caretaker of the site; Betty West; George and Joanne Kelley; Ben Roseberry; and William Young's granddaughter, Dorothy Miller and Alvin Miller; and the Rices Landing Civic Organization for Community Outgrowth, Norma and Murray Klein and Elisa Hildebrand. The knowledge from Peter Leibolt, David Shayt and Robert Vogel, all from the Smithsonian Institution, was also most helpful. Robert Craig, PE, volunteered as Project Mechanical Engineer.

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W.A. Young and Sons Foundry and Machine Shop, 1900-1965:
A Transitional Twentieth Century Machine Shop

From 1870 until 1918, industry in the United States experienced rapid growth as industrial complexes developed and large plants, from flour mills to steel mills, replaced the smaller factories of the nineteenth century. New vertically integrated mills dominated the industrial and technological landscape. Yet within the industrial panorama, large corporations did not completely dislodge smaller firms. Small companies and partnerships, like the W.A. Young and Sons Foundry and Machine Shop in Rices Landing, Pennsylvania, continued to operate alongside large mills, often supplying parts and special services to the large corporations.¹

During the early nineteenth century, foundries and machine shops were only slightly larger than blacksmith shops; the two differed more in machine power and clients than in how work was accomplished. Typically, blacksmith shops were equipped with a few foot-powered tools, served a local clientele, and performed a range of services from repairing farm equipment to forging horseshoes. Even the smallest town had a local smithy.

By 1900, however, machinery needs had changed, and new machine shops were created to meet the demand. These machine shops were usually large operations with an average of sixty-eight employees. Typically, each shop specialized in building one type of machinery, such as textile, locomotive or mine equipment. The shops were most often located in large cities, like Pittsburgh or Philadelphia.² In southwestern Pennsylvania

¹James MacGregor Burns, The Workshop of Democracy: The American Experiment, Vol. II (New York: Alfred A. Knopf, 1985), 75, 79, 106-107; Victor S. Clark, History of the Manufactures in the United States, Vol. III (1929; reprint, New York: Peter Smith, 1949), 153.

²Bruce Bomberger and William Sisson, Made in Pennsylvania: An Overview History of the Major Industries of the Commonwealth (Harrisburg, PA: Bureau for Historic Preservation and the Pennsylvania History and Museum Commission, 1985), 16-17, 42-44; Douglas Harper, Working Knowledge: Skill and Community in a Small Shop (Chicago: The University of Chicago Press, 1987); Douglas Harper, "On the History and Sociology of Practical Labor: The Village Blacksmith and the Garage Mechanic," presented at Annual Meeting of the Society for the History of Technology, History of Science Society, October 1991, 3; Alan I. Marcus and Howard P.

railroad shops were opened in Fayette and Washington counties. Large machine shops also serviced the needs of the region's coal companies and steel mills. Despite the growth and domination of large corporations, there was still a place for small shops, such as the W.A. Young and Sons' shop. The influence of both the modern machine shop and the blacksmith shop can be seen in the type of tools, clientele, structure and work organization of the Young shop. In fact, this shop represents a transition between the village blacksmith of the eighteenth and nineteenth centuries and the large machine shops of the twentieth.

Setting

Rices Landing, the location of the Young's machine shop, is located on the Monongahela River at the eastern edge of Greene County, sixty-eight miles south of Pittsburgh, and twelve miles south of Brownsville. Greene County, the southwestern-most county in Pennsylvania, is bordered by West Virginia on the south, Ohio on the west, Fayette County across the Monongahela River on the east, and Washington County, from which Greene was created from in 1796, on the north. European settlement began at Rices Landing in the 1780s, when John Rice received land patents for the property; several years later, he laid out the town that carries his name. In 1854 the town's prosperity and importance received a boost when the Pittsburgh-based Monongahela River Navigation Company built Lock and Dam No. 6 at Rices Landing.³

Rices Landing prospered as a commercial depot for the surrounding community. It became the shipping point for interior Greene County towns, including Waynesburg, the county seat, and Carmichaels. By 1859, Rices Landing was a thriving settlement of three hundred inhabitants, with a dry goods store, grocery store, distillery, grist and saw mill, and one foundry. In time, a boat yard was also built at Rices Landing. With the Monongahela River as the main source of prosperity for the town, Rices Landing expanded during the late nineteenth century. By 1876, two hotels

Segal, Technology in America: A Brief History (San Diego: Harcourt Brace Jovanovich, Publishers, 1989), 71-72.

³Christine Davis, "Rices Landing Historic District Nomination," (1992); J.W. Andrew, Local History [of Greene County] (N.p., N.d.); A History of the Monongahela Navigation Company (Pittsburgh: Bakewell and Marthens, 1873), 12.

and two commission houses had been added to the community.⁴ During this time, the economic fortunes of Rices Landing were dependent upon its position as a transfer point for Greene County. Unlike neighboring Brownsville, which was located on the National Road and the Monongahela River, Rices Landing never achieved prominence except as a local distribution point.

Encroachment on Rices Landing's position as the county distribution point started with railroad construction in the 1870s. The first of these was the Waynesburg and Washington Railway, a narrow-gauge road built between the two county seats of Greene and Washington counties. This road had an impact on Rices Landing's economic livelihood as goods could now be shipped on the railroad as an alternative to the river and road system. The Waynesburg and Washington Railway was leased to the Pittsburgh, Cincinnati and St. Louis Railway, providing local shippers a national outlet. A second line further intruded into Rices Landing's trade position when the Monongahela Railway opened its tracks across the river from Rices Landing.⁵ Rices Landing was not directly served by a railroad until 1906, when the Pittsburgh, Virginia and Charleston Railway was extended into the Rices Landing area. In 1913 this line was continued all the way through town in order to meet the transportation needs of the emerging coal and coke fields in Greene County.⁶

Although coal mines had operated in neighboring Fayette County since the 1870s, their development in Greene County started later, as companies began shifting their operations into new territory amid worries about the inevitable exhaustion of the Connellsville coal fields in Fayette County. The Dilworth Mine, the first deep-shaft mine in Greene County, was opened in 1902. Soon after, other mines also opened in the area, including the Nemacolin Mine, owned by Youngstown Sheet and Tube Company, and a

⁴Directory of the Monongahela and Youghiogheny Valleys (N.p.: George H. Thurston, 1859), 27.

⁵The Waynesburg and Washington Road was later bought by the Pennsylvania Railroad system, and was modified into a broad gauge railroad to help deliver coal and coke to World War II defense industries. H.W. Schotter, The Growth and Development of the Pennsylvania Railroad Company (Philadelphia: The Pennsylvania Railroad Company, 1927), 213; Waynesburg Republican (Waynesburg, Pennsylvania) 10 July 1941.

⁶Richard T. Wiley, Monongahela: The River and its Region (Butler, PA: The Ziegler Company, 1937), 211.

Crucible Steel Company mine at Crucible.⁷

Young's Venture

In response to the growing mechanical needs of the region, W.A. Young opened a machine shop in Rices Landing in 1900. Although always called a machine shop, in many ways the Young shop operated within the tradition of the village blacksmith. It differed in the variety of machines in the shop, but provided an array of services to members of both the rural and corporate communities.

William Young was the descendant of two established families of Washington and Greene counties. He was raised on a farm in Greene County near Rices Landing. This farm had been owned by his family since 1767. On the farm, William received training as a carpenter as well as a farmer. The first step toward the development of his machine shop occurred when he purchased a plot of land in the village of Rices Landing for \$700. In 1901 his mother, Rachel A. Young, bought the adjoining lot. The next year she sold it to him for \$400, the same price she had paid for it. William built his machine shop on these two parcels of land.⁸

An experienced carpenter, Young constructed a two-story clapboard structure using wood from the family farm, supplemented by wood purchased at the neighboring sawmill. This 45' by 40' building housed the machine and pattern shops. Over the next several years William expanded the structure by adding a back shop, 45' by 35' with a dirt floor, and in 1908, a large foundry. The foundry area, which was 75' by 72', included a charging cupola and a traveling overhead crane on an independent track.⁹

W.A. Young outfitted his shop primarily with second-hand

⁷Gloria Sharpnack Christy et. al., Rices Landing: A Bicentennial Sketch (The History Committee: 1976), 5.

⁸Samuel P. Bates, History of Greene County, Pennsylvania (Chicago: Nelson, Rishforth and Company, 1888), 638; Minerva Ammons to William A. Young, Deed Book 72: 59-61, Frank Carman to Rachel A. Young, Deed Book 125: 308-311; Rachel A. Young to William A. Young, Deed Book 193: 109-111; Greene County Courthouse, Waynesburg, Pennsylvania.

⁹Ralph B. Roseberry, "A Brief History," 1982, from the Roseberry Collection, Privately owned, Rices Landing, Pennsylvania.

machinery acquired through Pittsburgh agents and various catalogs. By 1941 the machinery in the shop included five engine lathes, four grinders, a drill press, one radial drill, pipe machines, a key seater, an automatic centering drill, power hacksaws, shapers, planers, milling machines, and a collection of other tools.¹⁰ (See Appendix 1) Machines were often bought second-hand in the belief that well-built machines, even if older, were a better value than new machines of lesser quality. The accuracy of the machines was more significant than their age. The largest lathe, according to family tradition, came from a Philadelphia shipyard. Other machines in the shop were acquired across a broad geographic area from firms in Detroit, Michigan; Worcester, Massachusetts; Buffalo, New York; Rutland, Vermont; Cincinnati and Cleveland, Ohio; as well as Erie, Lancaster, Philadelphia and Pittsburgh, Pennsylvania.¹¹

Unlike the simple blacksmith shops, with foot or water-powered tools, Young's machines were operated with a belt power system. The original motor was a 12-horsepower Vulcan steam engine with a separate 8-horsepower Negal engine to power the cupola blower. These were later replaced by a 20-horsepower Bessemer gas engine with a gravity-fed cooling system installed in the wood tank on the second floor. In the mid-1920s the Bessemer engine was replaced by a 20-horsepower Westinghouse electric motor.¹²

Young's collection of machines was vast, as befitted a "job shop," a firm that did any job that came its way, and was unlikely to specialize in any one operation. It was not unusual for a job shop to purchase a specific machine for an individual job, particularly if the job was done in a repetitious fashion, or if the machine could be used for other jobs as well. In a job shop, the organization of the tools was less significant than in that of a specialized shop. Since each job was different, there was no measurable economy of time or energy to be gained by arranging the machines according to the sequential production steps of a standardized product. Nonetheless, Young followed the traditional machine shop pattern of placing machine types together, in families. For example, he gathered his lathes

¹⁰Inventory of W.A. Young Machine Shop, [1940-41], from Roseberry Collection.

¹¹Interview with Alvin and Dorothy Miller by Mark Brown, July 1, 1991 in Rices Landing. Transcript available at HABS/HAER Office, Washington, DC.

¹²Roseberry, "A Brief History."

together, with the corresponding secondary machines located nearby.¹³ Another factor in determining the shop lay-out was the size and power requirement of each machine. The machines demanding the greatest amount of power were usually located closest to the main motor.¹⁴

The Young shop had four work areas: the foundry, back shop, front shop and pattern shop. The cupola furnace was in the foundry room, along with a casting tumbler, grinder, core oven, and molding sand. This room had a dirt floor to minimize fire hazards. Wooden flasks and frames, wheel and gear patterns were all stored in this room. All the patterns used in the shop were made by W.A. Young himself, and were made from yellow pine wood. The machines used to fabricate pieces of wood were located in the second-story pattern shop. The metal-working machines used for finishing cast pieces were dispersed between the rooms on the main floor.

Production and Staff

Throughout its existence, the W.A. Young Machine Shop employed only a few workers, seldom more than three at one time. The shop's owner, William A. Young, was the only pattern maker ever employed in the shop. The first founder was Robert Eicher of Carmichaels. Eicher received his training in his father's shop. After Eicher's death, Andy Moore of Smithfield ran the furnace.¹⁵ In 1907 Young hired Earl Crockard as an apprentice at a wage of fifty cents a day. At the conclusion of his four year term, Crockard went to work for the Crucible Steel Company at its New Mine. Franklin Grooms, Francis Sharpneck and Anson Sharpneck were also employed in the shop at various times. In later years, the two men most closely identified with the shop were Young's sons,

¹³ For shop layout, see Historic American Engineering Record drawings by Christopher Marston, Evelyn Green, Roderick Fluker and Paula Palombo included in this HAER report.

¹⁴ Interview with George Kelley, President, Greene County Historical Society, by Mark Brown, June 30, 1991. Transcript available at HABS/HAER Field Office, Homestead, Pennsylvania; Fred H. Colvin and Frank A. Stanley, Running A Machine Shop (New York: McGraw-Hill Book Company, 1941), 34.

¹⁵ Roseberry, "A Brief History;" Interview with Alvin and Dorothy Miller.

Walter and Carl.¹⁶

The Young shop remained small throughout its existence. Carl Young claimed that they would have lost control if they had employed as many as four or five individuals, because the union would enter the shop. Therefore, in spite of opportunities for big, sustained projects from the mines, the Young shop preferred not to bid on the largest jobs, but would often be subcontracted for a portion of it.¹⁷

Despite the desire to keep the shop small, the Young shop participated in war training programs during World War II which temporarily altered the work organization of the shop. In 1941 the Waynesburg Republican noted that the W.A. Young Machine Shop "is to be made available for men desiring to acquire skills in metal working crafts, particularly machine tool operations." Training would include operations of engine lathes, shapers, drill presses, planers, bench lathes and grinders. This program, which was run in cooperation with the Works Progress Administration, was open for men between the ages of 18 to 50. Upon completion of the course, it was expected that the trainees would "make their services available to holders of national defense contracts."¹⁸

Later the shop participated in a program that trained women, in addition to men, on its machine tools. Glenn Arnold of Green County was in charge of the program. A secretary was assigned to the shop to monitor progress and prepare necessary reports. The shop itself had to be modified as a women's wash room was added to the building.¹⁹ Three shifts of apprentices were trained on the machinery. In order to accommodate the training program, a third machinist had to be hired. Walter and Carl Young each supervised one shift of training, while William Minor handled the third shift. Minor had worked as a machinist in Frank Blackshire's shop at nearby Grays Landing until the closing of that facility. Although too small to partake in building machinery needed for the American war effort, the W.A. Young Shop

¹⁶Roseberry, "A Brief History."

¹⁷Interview with Alvin and Dorothy Miller.

¹⁸Waynesburg Republican (Waynesburg, Pennsylvania) 21 August 1941.

¹⁹It is unclear if these were two different programs, or if the program mentioned in the Waynesburg Republican was modified to include women.

had adequate facilities to train people for positions in large machine shops. However, these programs had little long-term impact on the Rices Landing shop.²⁰

In peacetime, Young's customers ranged from large corporations to small children and reflected the economic livelihood of Rices Landing. Because of its proximity to several large coal mines, much of the Young shop's work came from these corporations. For example, in 1923 the firm spent five months making parts for the steamship Atha, owned by the Crucible Fuel Company. The final bill for the work came to \$1,256.09. In 1928 the shop manufactured one worm drive ferry unit, and delivered it, by truck, to the Nemacolin mine. The parent company, Buckeye Coal, was billed \$275 for the transaction. W.A. Young also manufactured shafts for coal tipples and grape arbors for steamboats.²¹

Crucible was one of Young's regular customers. During a three-month period in 1935, for example, the company ordered drills, bushings, oiler cans, fifty grates, and a pair of 33" steel locomotive wheels. The machine shop also changed the wheels on a 13-ton locomotive and made a flange for a pump for Crucible.²² Although much of this order could be filled by quick machining, the manufacture of the wheels and grates was a major operation. For example, the first step in fabricating the steel iron railroad wheels was manufacturing the pattern. Young usually produced the pattern from a sketch or from the dimensions of an existing part. The pattern then went to the founder, who set the sand in the bottom part of the casting flask, covered it with the cope, or upper part of the mold, and turned the whole thing upside down. Meanwhile, coke and iron were stacked inside the cupola before it was fired-up. After sufficient temperature had been achieved inside the cupola, air was blown into the furnace. The founder tapped the furnace and molten metal poured into a ladle. A crane was used to maneuver the ladle, and the metal poured into the mold or casting flask and allowed to cool. The final finishing steps took place in the machine shop where numerous machines were used to refine the product, bore holes,

²⁰Interview with Alvin and Dorothy Miller.

²¹Invoice, W.A. Young and Sons to The Crucible Fuel Company (Steamer Atha), September 30, 1923; W.A. Young and Sons to Buckeye Coal Company, November 16, 1928.

²²Invoices, W.A. Young and Sons to the Crucible Fuel Company, January 2-February 28, 1935.

and correct tolerances.²³

Smaller companies also utilized the services of the Young shop. Burt Watson, a local oil contractor, engaged the firm to make pieces for his oil wells. Bridge contractor Ray Eddy also hired the company to manufacture bridge pieces. Young's decorative concrete formwork graces the arch of the 1913 railroad culvert over Pumpkin Run.²⁴

On a smaller scale, the shop made toys, and repaired bicycles for children. It also made automobile parts for individuals, including U-joints and axles for trucks. As was typical for local blacksmith and repair shops, prices were set more by custom, and a general sense of fairness, than by market price, a point the Young family takes great pride in noting today. Still, the shop was profitable, allowing William to vacation in Cuba and Florida, and providing his sons with employment throughout their lives.²⁵

Regional Machine Shops

Although the large machine shops have been best chronicled, they are not representative of the diversity of shops in existence in the twentieth century. In Pennsylvania, for example, there were 1,695 foundries and machine shops in 1913; 4D percent of them (7D0) employed 2 percent of the workers in small operations. Meanwhile, 72 percent of the machine shop workers were employed at the shops with over one hundred employees, which actually constituted only 12 percent of the total number of machine shops in Pennsylvania. The W.A. Young Machine Shop was more typical of the period than the large specialty shops of Hempstead, Mesta Machines and United Engineering.²⁶

²³C.W. Ammen, The Complete Handbook of Sand Casting (Blue Ridge Summit, PA: Tab Books, 1979).

²⁴Interview with Alvin and Dorothy Miller; Interview with Olan West by Christopher Marston, July 1991.

²⁵Harper, "On the History and Sociology of Practical Labor," 31; Interview with Alvin and Dorothy Miller.

²⁶U.S. Department of Commerce and Labor, Bureau of the Census, Thirteenth Census of the United States Taken in the Year 1910: Abstract of the Census, With Supplement for Pennsylvania (Washington, D.C.: GPO, 1913), 717.

Today the W.A. Young Machine Shop stands as an interesting example of an early twentieth century machine shop; however, it was not the only shop in the region. In 1931 the Young shop was one of three machine shops in Greene County; the other shops had one and ten employees, respectively. By 1941, only Young's and the smaller shop continued to operate, presumably serving both large corporations and local customers in the area.²⁷

In contrast, neighboring Washington County had five machine shops in 1931. The largest employed thirty-one men, the smallest one. In this more industrialized county the smallest shops ceased to exist by 1947, while those remaining expanded their workforce. Only one of the shops still open employed fewer than eight people.²⁸

Fayette County, with its train yards and extensive mining industry, also had large machine shops in Uniontown, Fairchance and Connellsville. By 1947, however, only half of the shops from 1931 remained open, one with thirty-six men, the other with eighteen. Only the Fairchance shop, with one worker, could be considered a neighborhood-dependent operation.²⁹

Regional Change

Despite the diversified use of Young's shop, there were changes on the state and national scene that affected the small machine shop in Rices Landing. First to have an impact was the growth of large-scale, efficient foundries in Pittsburgh. These foundries, combined with the expansion of Pittsburgh as a regional service center, no longer made it cost effective for

²⁷Commonwealth of Pennsylvania, Department of Internal Affairs, Seventh Industrial Directory of the Commonwealth of Pennsylvania (Harrisburg: 1931), 297-298; Commonwealth of Pennsylvania, Tenth Industrial Directory of the Commonwealth of Pennsylvania (Harrisburg: 1941), 250.

²⁸Seventh Industrial Directory, 670; Commonwealth of Pennsylvania, Eleventh Industrial Directory of the Commonwealth of Pennsylvania (Harrisburg: 1947), 605.

²⁹Seventh Industrial Directory, 278, 282; Eleventh Industrial Directory, 246.

Young to pour his own castings.³⁰ Therefore, after founder Andy Moore left the region in the early 1930s, Young chose not to replace him, and closed the foundry.³¹

In 1940, W.A. Young died, leaving his shop to his two sons, Walter and Carl, who continued to operate the shop much as it had been run by their father. After 1945, the decline in local coal production severely curtailed orders from the large coal operators. Operations continued, however, as the shop filled orders for individuals, including U-joints for older model trucks, propeller shafts, and truck axles. As the number of individuals who owned automobiles increased, the auto repair business became an increasingly larger part of the shop's business. The Youngs' modifications of the shop, including the selling of gasoline and building of a grease pit to work on cars inside the shop, reflect the growing importance of the automobile.³²

Other, more serious changes were still ahead. In 1965 the river lock at Rices Landing was demolished, decreasing the importance of the river in the community's livelihood. Roads and highways had taken on a new prominence across the country, as well as in Greene County. Although these transportation networks were critical to the development of Pennsylvania's industries, they often adversely affected small towns. With improved personal transportation, shoppers could travel to other, larger towns for consumer goods. At the same time, large companies could distribute goods into towns that had been too inaccessible to be profitable. This joint expansion of highways, coupled with the growth of hardware stores, proved to be a death knell for small shops.³³

Although the Youngs had made numerous modifications over the

³⁰Glenn E. McLaughlin, Growth of American Manufacturing Areas: A Comparative Analysis, With Special Emphasis on Trends in the Pittsburgh District (Pittsburgh, PA: Bureau of Business Research, University of Pittsburgh, 1938), 280.

³¹After Moore got sick he left the region to live in Ohio with relatives. Interview with Alvin and Dorothy Miller.

³²Interview with Alvin and Dorothy Miller; Tribune Review (Greensburg, Pennsylvania) 5 March 1989.

³³For an update on the distribution trends in the hardware industry see, Peter F. Drucker, "The Economy's Power Shift," The Wall Street Journal 24 September 1992.

years, they could no longer compete with these changes. As hardware shops could provide inexpensive plumbing and automobile parts, the need for specialty, neighborhood job shops diminished. W.A. Young and Sons Machine Shop closed in 1965 after the death of Carl, the last remaining Young who worked in the shop. The family sold the shop to private investors in 1969, and in 1985 the building and all its machinery was purchased by the Greene County Historical Society. Today the shop still stands, hardly changed since the days of operation under William A. Young. With virtually all its machinery intact, it is a pristine example of the twentieth-century local machine shop.

In many ways the Young shop was a transitional one, combining traditional work patterns and local business with service to large corporations. The machinists supervised themselves, and enjoyed the control they had over their own work routine. Continuing in the long tradition of the village blacksmith, Young provided important services to the local farmer, automobile owner and home owner. Working with relatively modern machines, the shop produced metal products for everyone from children to local contractors to the mining industry. Within the history of industrialization in southwestern Pennsylvania, the shop can be considered anachronistic only if we choose to remember just the largest urban factories, while ignoring the subtle changes industrialization wrought on the countryside as well.

Appendix #1

Inventory of equipment in W.A. Young and Sons
Prepared 1940-41 as Pre-requisite for Federal Training Program
From the Ralph B. Roseberry Collection

Bench Lathe 10 x 45--Taper attach motor--Good--Sheldon Machine
Company--3 years 80 hrs. per week.

Engine Lathe 14 x 10' Strait motor and line shaft fair
mfg. Lodge and Davis Machine Tool Co.--80 hrs.

Engine Lathe 20' x 8'--Taper attach--turret head--motor and line
shaft--Good--American Tool Works--1918--hrs-80.

Engine Lathe- 17" x 10' Strait-Line Shaft--Good
Kahn Carpenter 30 yr 80 hrs.

Engine Lathe- 36' x 24'- Taper attach--line shaft- Good
Isrial Johnson Jr co- 30 yrs--80 hrs.

Planer--30" x 30" x 10'- 2 heads- line shaft- Fair
Woodward Powell Planer Co 25 yrs-- 80 hrs per week.

Shaper 24" Table and vise--Line shaft--Fair
Cincinnati Shaper 30 years 80 hrs per week

Beckers Vertical Miller #5 V Blocks--Line shaft
Fair--Becker Brainiard Milling Machine 30 yrs
80 hrs.

Drill Press 20" vises and etc--Line shaft--Fair
Sibley and Ware--80 hrs.

Radial Drill--5'- 2 tables and vises--Good
Bickford Drill and Tool Co--30 yrs--80 hrs.

Keyseater--#1--Bolts clamps and etc--Line shaft--Good
Baker Brothers--20 years--80 hrs.

Thd machine--1/4 to 2" pipe 5/8 to 1 1/2 rods-- Both hand
vises Line Shaft--fair--Jaricki--25 yrs--80 hrs.

Pipe Mach. 2 to 5" pipe bolts 1 to 2"--both kind vises
Line shaft--Good Jaricki Mfg. Co. 25 yrs--40 hrs.

Power Stack Saw 9" x 9"--strait-line shaft Good

Purless Mach. Co.--20 yrs--80 hrs.

Power Stack Saw 4" x 4" [illegible] line shaft--Fair
Stover Co.--40 hrs.

Drill Grinder 1/2" to 1 1/2"--regular--Line shaft--Fair
Wilfred Eames Co.--25 yrs--20hrs.

Emery Grinder 18 x 2 1/4" [illegible] Line shaft Fair
Diammons Machine Co.--35 yrs.--20 hrs.

Vertical Power Hack Saw- 4" x 4"--[illegible]--Line shaft--Fair
Name Plate removed--35 yrs. 10 hrs.

Bench Drill--12" vise--motor and line shaft--Good
[illegible] Otto Mfg. Co.--15 yrs--40 hrs.

Centering [illegible] 4" strait--line shaft--Fair
Name Plate removed--25 yrs--20 hrs.

5 various emery grinders
most all kind tools, drills, vises, bench and [illegible]
Blacksmith forge
250 ton hydraulic press
50 ton hand press
300 AMP [illegible] elec. welder
acetylene cutting and welding outfit
and various things to numerous to mention.

** An inventory of equipment in W. A. Young & Son's Foundry and Machine Shop at the time of the HAER documentation can be found on drawings Nos. 3-5 which accompany this overview history.

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